CLAIMS

1. A DNA sequence selected from the group consisting of the DNA inserts of Z-pBR322(Pst)/HcIF-4c, Z-pBR322(Pst)/HcIF-2h, Z-pBR322(Pst)/HcIF-SN35, Z-pBR322(Pst)/HcIF-SN42, Z-pKT287(Pst)/HcIF-2h-AH6, DNA sequences which hybridize to any of the foregoing DNA inserts, DNA sequences, from whatever source obtained, including natural, synthetic or semi-synthetic sources, related by mutation, including single or multiple, base substitutions, deletions, insertions and inversions to any of the foregoing DNA sequences or inserts, and DNA sequences comprising sequences of codons which on expression code for a polypeptide displaying similar immunological or biological activity to a polypeptide coded for on expression of the codons of any of the foregoing DNA sequences and inserts.

2. A DNA sequence according to claim 1 wherein said DNA sequence which hybridizes to said DNA insert is selected from the group consisting of the DNA inserts of Z-pBR322(Pst)/HcIF-II-206 or Z-pBR322 (Pst)/HcIF-SN35-AHL6, DNA sequences which hybridize to any of the foregoing DNA inserts, DNA sequences, from whatever source obtained, including natural, synthetic or semi-synthetic sources, related by mutation, including single or multiple, base substitutions, deletions, insertions and inversions to any of the foregoing DNA sequences or inserts, and DNA sequences comprising sequences of codons which on expression code for a polypeptide displaying similar immunological or biological activity to a polypeptide coded for on expression of the codons of any of the foregoing DNA sequences and inserts.

3. A DNA sequence according to claim 1 wherein said DNA sequence which hybridizes to said DNA insert is selected from the group consisting of Hif-chr1, Hif-chr3, Hif-chr12, Hif-chr13, Hif-chr16-2, Hif-chr26, Hif-chr30, Hif-chr35, DNA sequences which hybridize to any of the foregoing DNA sequences, DNA sequences, from

whatever source obtained, including natural, synthetic, or semi-synthetic sources, related by mutation, including single or multiple, base substitutions, deletions, insertions and inversions, to any of the foregoing DNA sequences and DNA sequences comprising sequences of codons which on expression code for a polypeptide similar in immunological or biological activity to a polypeptide coded for on expression of any of the foregoing DNA sequences.

4. A DNA sequence according to claim 1 wherein said DNA sequence which hybridizes to said DNA insert is selected from the group consisting of Hif-chr19, Hif-chr27, DNA sequences which hybridize to any of the foregoing DNA sequences, DNA sequences, from whatever source obtained, including natural, synthetic, or semi-synthetic sources, related by mutation, including single or multiple, base substitutions, deletions, insertions and inversions, to any of the foregoing DNA sequences and DNA sequences comprising sequences of codons which on expression code for a polypeptide similar in immunological or biological activity to a polypeptide coded for on expression of any of the foregoing DNA sequences.

5. A DNA sequence selected from the group consisting of DNA sequences of the formula: ATGGCCTCGCCC TTTGCTTTACTGATGGTCCTGGTGGTGCTCAGCTGCAAGTCAAGCTGCTCTCTGGGC TGTGATCTCCCTGAGACCCACAGCCTGGATAACAGGAGGACCTTGATGCTCCTGGCA CAAATGAGCAGAATCTCTCCTTCCTCCTGTCTGATGGACAGACATGACTTTGGATTT CCCCAGGAGGAGTTTGATGGCAACCAGTTCCAGAAGGCTCCAGCCATCTCTGTCCTC CATGAGCTGATCCAGCAGATCTTCAACCTCTTTACCACAAAAGATTCATCTGCTGCT TGGGATGAGGACCTCCTAGACAAATTCTGCACCGAACTCTACCAGCAGCTGAATGAC TTGGAAGCCTGTGTGATGCAGGAGGAGAGGGTGGGAGAAACTCCCCTGATGAATGCG GACTCCATCTTGGCTGTGAAGAAATACTTCCGAAGAATCACTCTCTATCTGACAGAG AAGAAATACAGCCCTTGTGCCTGGGAGGTTGTCAGAGCAGAAATCATGAGATCCTCT CTTTATCAACAAACTTGCAAGAAAGATTAAGGAGGAAGGAATAA, TGTGATCTCCC TGAGACCCACAGCCTGGATAACAGGAGGACCTTGATGCTCCTGGCACAAATGAGCAG AATCTCTCCTTCCTCCTGTCTGATGGACAGACATGACTTTGGATTTCCCCAGGAGGA GTTTGATGGCAACCAGTTCCAGAAGGCTCCAGCCATCTCTGTCCTCCATGAGCTGAT CCAGCAGATCTTCAACCTCTTTACCACAAAAGATTCATCTGCTGCTTGGGATGAGGA

CCTCCTAGACAAATTCTGCACCGAACTCTACCAGCAGCTGAATGACTTGGAAGCCTG
TGTGATGCAGGAGGAGAGGGTGGGAGAAACTCCCCTGATGAATGCGGACTCCATCTT
GGCTGTGAAGAAATACTTCCGAAGAATCACTCTCTATCTGACAGAGAAGAAATACAG
CCCTTGTGCCTGGGAGGTTGTCAGAGCAGAAATCATGAGATCCCTCTCTTTATCAAC
AAACTTGCAAGAAAGATTAAGGAGGAAGGAATAA and fragments and derivatives thereof, said fragments and derivatives coding for polypeptides displaying an immunological or biological activity of IFN-α.

6. A DNA sequence selected from the group consisting of DNA sequences of the formula: TTACTGGTGGCC
CTCCTGGTGCTCAGCTGCAAGTCAAGCTGCTCTGTGGGCTGTGATCTGCCTCAAACC
CACAGCCTGGGTAGCAGGAGGACCTTGATGCTCCTGGCACAGATGAGGAGAATCTCT
CTTTTCTCCTGCTTGAAGGACAGACATGACTTTGGATTTCCCCAGGAGGAGTTTGGC
AACCAGTTCCAAAAGGCTGAAACCATCCCTGTCCTCCATGAGATGATCCAGCAGATC
TTCAATCTCTTCAGCACAAAGGACTCATCTGCTGCTTGGGATGAGACCCTCCTAGAC
AAATTCTACACTGAACTCTACCAGCAGCTGAATGACCTGGAAGCCTGTGTGATACAG
GGGGTGGGGGTGACAGAGACTCCCCTGATGAAGGAGGACTCCATTCTGGCTGTGAGG
AAATACTTCCAAAGAATCACTCTCTATCTGAAAGAGAAGAAATACAGCCCTTGTGCC
TGGGAGGTTGTCAGAGCAGAAATCATGAGATCTTTTTCTTTGTCAACAAACTTGCAA
GAAAGTTTAAGAAGTAAGGAATGA, TGTGATCTGCCTCAAACCCACAGCCTGGGTA
GCAGGAGGACCTTGATGCTCCTGGCACAGATGAGGAGAATCTCTCTTTTCTCCTGCT
TGAAGGACAGACATGACTTTGGATTTCCCCAGGAGGAGTTTGGCAACCAGTTCCAAA
AGGCTGAAACCATCCCTGTCCTCCATGAGATGATCCAGCAGATCTTCAATCTCTTCA
GCACAAAGGACTCATCTGCTGCTTGGGATGAGACCCTCCTAGACAAATTCTACACTG
AACTCTACCAGCAGCTGAATGACCTGGAAGCCTGTGTGATACAGGGGGTGGGGGTGA
CAGAGACTCCCCTGATGAAGGAGGACTCCATTCTGGCTGTGAGGAAATACTTCCAAA
GAATCACTCTCTATCTGAAAGAGAAGAAATACAGCCCTTGTGCCTGGGAGGTTGTCA
GAGCAGAAATCATGAGATCTTTTTCTTTGTCAACAAACTTGCAAGAAAGTTTAAGAA
GTAAGGAATGA and fragments and derivatives thereof, said fragments and derivatives coding for polypeptides displaying an immunological or biological activity of IFN-α.

7. A DNA sequence selected from the group consisting of DNA sequences of the formula: ATGGCCCTGTCC
TTTTCTTTACTGATGGCCGTGCTGGTGCTCAGCTACAAATCCATCTGTTCTCTGGGC
TGTGATCTGCCTCAGACCCACAGCCTGGGTAATAGGAGGACCTTGATACTCCTGCAA
CAAATGGGAAGAATCTCTCATTTCTCCTGCCTGAAGGACAGACATGATTTCGGATTC
CCCGAGGAGGAGTTTGATGGCCACCAGTTCCAGAAGACTCAAGCCATCTCTGTCCTC

CATGAGATGATCCAGCAGACCTTCAATCTCTTCAGCACAGAGGACTCATCTGCTGCT
TGGGAACAGAGCCTCCTAGAAAAATTTTCCACTGAACTTTACCAGCAACTGAATGAC
CTGGAAGCATGTGTGATACAGGAGGTTGGGGTGGAAGAGACTCCCCTGATGAATGTG
GACTCCATCCTGGCTGTGAGGAAATACTTCCAAAGAATCACTCTTTATCTAACAGAG
AGAAGAAATACAGCCCTTGTGCCTGGGAGGTTGTAAAAAAGATTAAGGAGGAAGGAT
TGA, TGTGATCTGCCTCAGACCCACAGCCTGGGTAATAGGAGGACCTTGATACTCC
TGCAAGAAATGGGAAGAATCTCTCATTTCTCCTGCCTGAAGGACAGACATGATTTCG
GATTCCCCGAGGAGGAGTTTGATGGCCACCAGTTCCAGAAGACTCAAGCCATCTCTG
TCCTCCATGAGATGATCCAGCAGACCTTCAATCTCTTCAGCACAGAGGACTCATCTG
CTGCTTGGGAACAGAGCCTCCTAGAAAAATTTTCCACTGAACTTTACCAGCAACTGA
ATGACCTGGAAGCATGTGTGATACAGGAGGTTGGGGTGGAAGAGACTCCCCTGATGA
ATCTGGACTCCATCCTGGCTGTGAGGAAATACTTCCAAAGAATCACTCTTTATCTAA
CAGAGAAGAAATACAGCCCTTGTGCCTGGGAGGTTGTCAGAGCAGAAATCATGAGAT
CCCTCTCGTTTTCAACAAACTTGCAAAAAAGATTAAGGAGGAAGGATTGA and
fragments and derivatives thereof, said fragments and derivatives coding for polypeptides displaying an immunological or biological activity of IFN-α.

8. A recombinant DNA molecule comprising a DNA sequence said DNA sequence being selected from the group consisting of DNA sequences according to claim 1, 2, 3, 4, 5, 6 or 7.

9. The recombinant DNA molecule according to claim 8, wherein said DNA sequence is operatively linked to an expression control sequence.

10. A recombinant DNA molecule according to claim 9, wherein said expression control sequence is selected from the group consisting of a lac system, a β-lac system, a trp system, major operator and promotor regions of phage λ, the control region of fd coat protein, and other sequences which control the expression of genes of prokaryotic or eukaryotic cells and their viruses.

11. A recombinant DNA molecule according to claim 9 or 10 selected from the group consisting of C8-IFN-α1, C8-IFN-α2, LAC-AUG(α2) and β-lac-AUG(α2).

12. A host transformed with at least one recombinant DNA molecule, said recombinant DNA molecule

being selected from the group consisting of recombinant DNA molecules according to claim 8, 9, 10 or 11.

13. The host of claim 12 selected from the group consisting of strains of E. coli, Pseudomonas, Bacillus subtilis, Bacillus stearothermophilus, other bacilli, yeasts, other fungi, mouse or other animal or plant hosts and human tissue cells.

14. The transformed host according to claim 12 or 13 selected from the group consisting of E. coli HB101 (Z-pBR322(Pst)/HcIF-4c), E. coli HB101 (Z-pBR322(Pst)/ HcIF-2h), E. coli HB101 (Z-pBR322(Pst)/HcIF-SN35), E. coli HB101 (Z-pBR322(Pst)/ HcIF-SN42), and E. coli HB101 (Z-pKT287(Pst)/HcIF-2h-AH6).

15. The transformed host according to claim 12 or 13 selected from the group consisting of E. coli HB101 (Z-pBR322(Pst)/HcIF-II-206) and E. coli HB101 (Z-pBR322(Pst)/ HcIF-SN35-AHL6).

16. The transformed host according to claim 12 or 13 selected from the group consisting of HchrIF-A, HchrIF-B, HchrIF-C, HchrIF-D, HchrIF-E, HchrIF-F, HchrIF-G, HchrIF-H, HchrIF-I, and HchrIF-J.

17. The transformed host according to claim 12 or 13 selected from the group consisting of E. coli DS410 (C8-IFN-α1), E. coli DS410 (C8-IFN-α2), E. coli DS410 (LAC-AUG(α2)), E. coli DS410 HB101 (βlac-AUG(α2)) and Mouse 3T3 (polynoma-Hif-chr35).

18. The transformed host according to claim 12 or 13 selected from the group consisting of HchrIF-K, HchrIF-L, HchrIF-M, HchrIF-N, HchrIF-O, HchrIF-P, HchrIF-Q and hosts transformed with Hif-chr19 and Hif-chr27.

19. A polypeptide or fragments and derivatives thereof displaying an immunological or biological activity of human leukocyte interferon produced by the transformed host, said transformed host being selected from the group consisting of the transformed hosts according to claim 12, 13, 14, 15, 16 or 17 or 18.

20. A polypeptide that it is coded for by a DNA sequence selected from the group consisting of DNA sequences according to claim 1, 2, 3, 4, 5, 6 or 7.

21. A polypeptide or fragments and derivatives thereof selected from the group consisting of IFN-α1, IFN-α2, IFN-α4a and IFN-α4b.

22. A polypeptide or fragments and derivatives thereof selected from the group consisting of polypeptides of the formula: METALASERPROPHEALALEULEUMETVALLEU VALVALLEUSERCYSLYSSERSERCYSSERLEUGLYCYSASPLEUPROGLUTHRHIS SERLEUASPASNARGARGTHRLEUMETLEULEUALAGLNMETSERARGILESERPRO SERSERCYSLEUMETASPARGHISASPPHEGLYPHEPROGLNGLUGLUPHEASPGLY ASNGLNPHEGLNLYSALAPROALAILESERVALLEUHISGLULEUILEGLNGLNILE PHEASNLEUPHETHRTHRLYSASPSERSERALAALATRPASPGLUASPLEULEUASP LYSPHECYSTHRGLULEUTYRGLNGLNLEUASNASPLEUGLUALACYSVALMETGLN GLUGLUARGVALGLYGLUTHRPROLEUMETASNALAASPSERILELEUALAVALLYS LYSTYRPHEARGARGILETHRLEUTYRLEUTHRGLULYSLYSTYRSERPROCYSALA TRPGLUVALVALARGALAGLUILEMETARGSERLEUSERLEUSERTHRASNLEUGLN GLUARGLEUARGARGLYSGLU, CYSASPLEUPROGLUTHRHISSERLEUASPASN ARGARGTHRLEUMETLEULEUALAGLNMETSERARGILESERPROSERSERCYSLEU METASPARGHISASPPHEGLYPHEPROGLNGLUGLUPHEASPGLYASNGLNPHEGLN LYSALAPROALAILESERVALLEUHISGLULEUILEGLNGLNILEPHEASNLEUPHE THRTHRLYSASPSERSERALAALATRPASPGLUASPLEULEUASPLYSPHECYSTHR GLULEUTYRGLNGLNLEUASNASPLEUGLUALACYSVALMETGLNGLUGLUARGVAL GLYGLUTHRPROLEUMETASNALAASPSERILELEUALAVALLYSLYSTYRPHEARG ARGILETHRLEUTYRLEUTHRGLULYSLYSTYRSERPROCYSALATRPGLUVALVAL ARGALAGLUILEMETARGSERLEUSERLEUSERTHRASNLEUGLNGLUARGLEUARG ARGLYSGLU, and polypeptides from whatever source obtained related to any of the foregoing polypeptides by mutation, including single or multiple, base substitutions, deletions, insertions and inversions of the DNA sequences which code for them.

23. A polypeptide or fragments and derivatives thereof selected from the group consisting of polypeptides of the formula: LeuLeuValAlaLeuLeuValLeuSerCysLysSerSer CysSerValGlyCysAspLeuProGlnThrHisSerLeuGlySerArgArgThrLeu MetLeuLeuAlaGlnMetArgArgIleSerLeuPheSerCysLeuLysAspArgHis

AspPheGlyPheProGlnGluGluPheGlyAsnGlnPheGlnLysAlaGluThrIle
ProValLeuHisGluMetIleGlnGlnIlePheAsnLeuPheSerThrLysAspSer
SerAlaAlaTrpAspGluThrLeuLeuAspLysPheTyrThrGluLeuTyrGlnGln
LeuAsnAspLeuGluAlaCysValIleGlnGlyValGlyValThrGluThrProLeu
MetLysGluAspSerIleLeuAlaValArgLysTyrPheGlnArgIleThrLeuTyr
LeuLysGluLysLysTyrSerProCysAlaTrpGluValValArgAlaGluIleMet
ArgSerPheSerLeuSerThrAsnLeuGlnGluSerLeuArgSerLysGlu, CysAsp
LeuProGlnThrHisSerLeuGlySerArgArgThrLeuMetLeuLeuAlaGlnMet
ArgArgIleSerLeuPheSerCysLeuLysAspArgHisAspPheGlyPheProGln
GluGluPheGlyAsnGlnPheGlnLysAlaGluThrIleProValLeuHisGluMet
IleGlnGlnIlePheAsnLeuPheSerThrLysAspSerSerAlaAlaTrpAspGlu
ThrLeuLeuAspLysPheTyrThrGluLeuTyrGlnGlnLeuAsnAspLeuGluAla
CysValIleGlnGlyValGlyValThrGluThrProLeuMetLysGluAspSerIle
LeuAlaValArgLysTyrPheGlnArgIleThrLeuTyrLeuLysGluLysLysTyr
SerProCysAlaTrpGluValValArgAlaGluIleMetArgSerPheSerLeuSer
ThrAsnLeuGlnGluSerLeuArgSerLysGlu, and polypeptides from whatever source obtained related to any of the foregoing polypeptides by mutation, including single or multiple, base substitutions, deletions, insertions and inversions of the DNA sequences which code for them.

24. A polypeptide or fragments and derivatives thereof selected from the group consisting of polypeptides of the formula: METALALEUSERPHESERLEULEUMETALAVALLEUVAL
LEUSERTYRLYSSERILECYSSERLEUGLYCYSASPLEUPROGLNNTHRHISSER
LEUGLYASNARGARGTHRLEUILELEULEUGLNGLNMETGLYARGILESERHISPHE
SERCYSLEULYSASPARGHISASPPHEGLYPHEPROGLUGLUGLUPHEASPGLYHIS
GLNPHEGLNLYSTHRGLNALAILESERVALLEUHISGLUMETILEGLNGLNTHRPHE
ASNLEUPHESERTHRGLUASPSERSERALAALATRPGLUGLNSERLEULEUGLULYS
PHESERTHRGLULEUTYRGLNGLNLEUASNASPLEUGLUALACYSVALILEGLNGLU
VALGLYVALGLUGLUTHRPROLEUMETASNVALASPSERILELEUALAVALARGLYS
TYRPHEGLNARGILETHRLEUTYRLEUTHRGLULYSLYSTYRSERPROCYSALATRP
GLUVALVALARGALAGLUILEMETARGSERLEUSERPHESERTHRASNLEUGLNLYS
ARGLEUARGARGLYSASP, CYSASPLEUPROGLNTHRHISERLEUGLYASNARGARG
THRLEUILELEULEUGLNGLNMETGLYARGILESERHISPHESERCYSLEULYSASP
ARGHISASPPHEGLYPHEPROGLUGLUGLUPHEASPGLYHISGLNPHEGLNLYSTHR
GLNALAILESERVALLEUHISGLUMETILEGLNGLNTHRPHEASNSEUPHESERTHR
GLUASPSERSERALAALATRPGLUGLNSERLEULEUGLULYSPHESERTHRGLULEU

TYRGLNGLNLEUASNASPLEUGLUALACYSVALILEGLNGLUVALGLYVALGLUGLU
THRPROLEUMETASNVALASPSERILELEUALAVALARGLYSTYRPHEGLNARGILE
THRLEUTYRLEUTHRGLULYSLYSTYRSERPROCYSALATRPGLUVALVALARGALA
GLUILEMETARGSERLEUSERPHESERTHRASNLEUGLNLYSARGLEUARGARGLYSASP,
and polypeptides from whatever source obtained related to any of the foregoing polypeptides by mutation, including single or multiple, base substitutions, deletions, insertions and inversions of the DNA sequences which code for them..

25. A method for producing a recombinant DNA molecule comprising the step of introducing into a cloning vehicle a DNA sequence, said DNA sequences being selected from the group consisting of DNA sequences according to claim 1, 2, 3, 4, 5, 6 or 7.

26. The method according to claim 25 comprising the additional step of introducing into said cloning vehicle an expression control sequence according to claim 10, said expression control sequence being introduced into said cloning vehicle so as to control and to regulate the expression of said DNA sequence.

27. A method for transforming a host comprising the step of introducing into a host a recombinant DNA molecule, said recombinant DNA molecule being selected from the group consisting of recombinant DNA molecules according to claim 8, 9, 10 to 11.

28. A method for producing a polypeptide displaying an immunological or biological activity of human leukocyte interferon, comprising the steps of transforming an appropriate host with a recombinant DNA molecule according to claim 10 or 11; culturing said host; and collecting said polypeptide.

29. The method according to claim 28, wherein the host is selected from the group consisting of strains of E. coli, Pseudomonas, Bacillus subtilis, Bacillus stearothermophilus, other bacilli, yeasts, fungi, animal or plant hosts, and human tissue cells.

30. A method for producing a polypeptide displaying an immunological or biological activity of

human leukocyte interferon comprising the steps of culturing a host transformed by a recombinant DNA molecule according to claim 10 or 11 and collecting said polypeptide.

31. A process for selecting a DNA sequence coding for a polypeptide displaying an immunological or biological activity of HuIFNα from a group of DNA sequences comprising the step of determining which of said DNA sequences hybridize to a DNA sequence, said DNA sequence being selected from the group consisting of DNA sequences according to claim 1, 2, 3, 4, 5, 6 or 7.

32. The process of claim 31 wherein said DNA sequence screened is selected from the group consisting of DNA sequences from natural sources, synthetic DNA sequences, DNA sequences from recombinant DNA molecules and DNA sequences which are a combination of any of the foregoing DNA sequences.

33. A composition for treating human viruses or treating human cancers or tumors which comprises at least one polypeptide selected from the group consisting of a polypeptide, said polypeptide being selected from the group consisting of polypeptides according to claim 19, 20, 21, 22, 23 or 24.

34. A composition for treating bovine viral infections which comprises at least one polypeptide selected from the group consisting of a polypeptide, said polypeptide being selected from the group consisting of polypeptides according to claim 19, 20, 21, 22, 23 or 24.

35. A method for treating human viruses or treating human cancers or tumors which comprises administering to said humans in a pharmaceutically acceptable manner an effective amount of a composition according to claim 33.

36. A method for treating bovine viral infections which comprises administering to said animals in a pharmaceutically acceptable manner an effective amount of a composition according to claim 34.

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